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PATENT APPLICATION

ATTORNEY DOCKET NO. 100202201-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Eric Anderson

Confirmation No.: 5490

Application No.: 10/600,601

Examiner: Usmaan Saeed

Filing Date: 08-20-2003

Group Art Unit: 2166

Title: Adaptive Migration Planning and Execution

Mail Stop Appeal Brief-Patents
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TRANSMITTAL OF APPEAL BRIEFTransmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 07-26-2007.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month
\$120

☐ 2nd Month
\$450

☐ 3rd Month
\$1020

☐ 4th Month
\$1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.
* No fee is due (fee previously paid on 1-3-2007).

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Typed Name: Ginger Yount

Signature: 

Rev 10/06a (Ap/Brief)

Respectfully submitted,

Eric Anderson

By 

Dan C. Hu

Attorney/Agent for Applicant(s)

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Inventor(s): Eric Anderson

Confirmation No.: 5490

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Examiner: Usmaan Saeed

Filing Date: 06-20-2003

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Title: Adaptive Migration Planning and Execution

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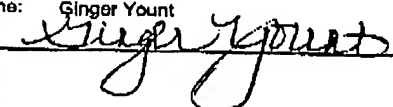
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Rev 10/05a (AppBrief)

Respectfully submitted,

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Applicants:	Eric Anderson	§	Art Unit:	2166
Serial No.:	10/600,601	§		
Filed:	June 20, 2003	§	Examiner:	Usmaan Saeed
For:	Adaptive Migration Planning and Execution	§	Atty. Dkt. No.:	100202201-1 (HPC.0316US)

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SECOND
APPEAL BRIEF PURSUANT TO 37 C.F.R § 41.37

Sir:

The rejection of claims 1-15, 17-22, 24-27, and 29-34 is hereby appealed.

I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Co., L.P.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1-15, 17-22, 24-27, and 29-34 have been twice rejected and are the subject of this appeal. Claims 16, 23, and 28 have been cancelled.

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<u>Ginger Yount</u>	
Ginger Yount	

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IV. STATUS OF AMENDMENTS

No amendment after the Office Action of April 27, 2007 has been submitted.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The following provides a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element.

Independent claim 1 recites a method for performing adaptive migration and execution, the method comprising:

obtaining (Fig. 3A:205; Fig. 3B:205) a plan generated by a planner (Fig. 2:105) executable in a computer (Spec., 11:7-16; 15:7-8; 19:1-2);

adapting (Fig. 3A:210; Fig. 3B:252) the plan to satisfy migration constraints (Spec., 15:8-9; 20:11-21:13);

executing (Fig. 3A:215, 225; Fig. 3B:253, 254, 225) at least one move of a data chunk in the plan (Spec., 15:15-19; 19:7-12);

feeding back information relating to the execution of the at least one move to the planner (Spec., 11:19-12:3; 17:15-17; 19:13-15); and

modifying the plan by the planner in response to the information (Spec., 11:21-23; 16:5-7; 19:13-14).

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Independent claim 10 recites a method for performing adaptive migration and execution, the method comprising:

obtaining (Fig. 3A:205; Fig. 3B:205) a plan created by a planner (Fig. 2:105) executable in a computer;

determining (Fig. 3A:210; Fig. 3B:252) all valid moves in the plan (Spec., 15:8-9; 20:11-21:13);

executing (Fig. 3A:215, 225; Fig. 3B:253, 254, 225) a valid move (Spec., 15:15-19; 19:7-12);

feeding back information relating to execution of the valid move to the planner (Spec., 11:19-12:3; 17:15-17; 19:13-15); and

if at least one additional move is required, modifying the plan by the planner based on the information (Spec., 11:21-23; 16:5-7; 19:13-14).

Independent claim 14 recites an article of manufacture, comprising:

a machine-readable medium having stored thereon instructions to:

obtain (Fig. 3A:205; Fig. 3B:205) a plan (Spec., 11:7-16; 15:7-8; 19:1-2);

adapt (Fig. 3A:210; Fig. 3B:252) the plan to satisfy migration constraints (Spec., 15:8-9; 20:11-21:13);

execute (Fig. 3A:215, 225; Fig. 3B:253, 254, 225) at least one move of a data chunk in the plan (Spec., 15:15-19; 19:7-12);

modifying the plan based on feedback configuration information regarding in-progress execution of the at least one move (Spec., 11:21-23; 16:5-7; 19:13-14); and

execute another move in the modified plan (Spec., 16:4-8; 19:15-20).

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Independent claim 15 recites an apparatus for adaptive migration, the apparatus comprising:

a planner (Fig. 2:105) configured to generate a migration plan based upon configuration information (Spec., 11:7-8);

an adapter (Fig. 2:115) configured to receive the plan from the planner, to receive migration constraints information, target configuration information and current configuration information, and to transmit the configuration information to the planner (Spec., 10:18-11:16; 13:1-2; 13:15-14:6); and

at least one executor (Fig. 2:110) configured to execute a move in the plan, wherein the configuration information relates to execution of the move (Spec., 11:17-23; 15:18-24; 19:10-12).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Claims 1-15, 17-22, 24-27, And 29-34 Rejected Under 35 U.S.C. § 102 Over U.S. Patent No. 6,381,619 (Borowsky).**

VII. ARGUMENT

The claims do not stand or fall together. Instead, Appellant presents separate arguments for various independent and dependent claims. Each of these arguments is separately argued below and presented with separate headings and sub-headings as required by 37 C.F.R. § 41.37(c)(1)(vii).

- A. Claims 1-15, 17-22, 24-27, And 29-34 Rejected Under 35 U.S.C. § 102 Over U.S. Patent No. 6,381,619 (Borowsky).**

1. Claims 1-10, 12, 13, 30, and 31.

In response to the Appeal Brief submitted by Appellant on January 3, 2007, the Examiner withdrew the obviousness rejection of the claims over Borowsky and Kennedy, and instead, substituted an anticipation rejection of the claims over Borowsky.

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Previously, the Examiner conceded that Borowsky fails to disclose either the feeding back task or the modifying task of claim 1. *See* 7/31/2006 Office Action 4. However, the Examiner has changed the Examiner's position, and now instead is asserting that Borowsky does disclose the feeding back task and modifying task of claim 1. *See* 4/27/2007 Office Action at 4.

The Examiner was correct the first time when the Examiner stated that Borowsky fails to disclose the feeding back task and modifying task of claim 1.

In the 4/27/2007 Office Action, the Examiner cited Fig. 5 of Borowsky, and the associated text, as disclosing the feeding back task and modifying task of claim 1. The Examiner pointed to the "ADD MOVE TO PLAN" block 142, the "GOAL CONFIGURATION MET?" decision block 144, and the "BUILD PLAN" block 132 of Fig. 5 of Borowsky as corresponding to the feeding back task and modifying task of claim 1. Appellant respectfully disagrees with this assessment.

Borowsky describes a migration planner to migrate a data system from an initial configuration to a goal configuration represented as 10 and 14, respectively, in Fig. 1 of Borowsky. In performing the migration, data stores are moved, or migrated, among storage devices under the direction of a control 28. Borowsky, 3:48-51. As taught by Borowsky, a "migration plan," or more simply a "plan," includes information regarding a plurality of data migrations or moves from one configuration to another. Borowsky, 4:1-2, 26-27. A move represents the migration of a data store from one storage device to another storage device. Borowsky, 4:4-9. Thus, the "plans" referred to in Borowsky refer to plans regards moves of data stores between storage devices.

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The Examiner appears to have misunderstood the flow of Fig. 5 of Borowsky. Fig. 5 relates to generating a migration plan 120 by a migration planner 116. The various steps indicated in Fig. 5 are steps of the migration planner 116 in building a plan by selecting moves to add to the plan. Importantly, note that the flow of Fig. 5 “exits as the migration plan 120.” Borowsky, 5:35-37. The migration plan 120 that is built by the migration planner 116 according to Fig. 5 is “for implementation by the control 28.” *Id.*, 5:11. In other words, Fig. 5 refers to building a migration plan (in which moves are indicated); however, the migration plan is not executed by the migration planner 116. Thus, any of the steps depicted in Fig. 5 do not relate to *execution* of a move, but rather to building of a migration plan that indicates the selected moves. After output of the migration plan 120 (upon exit of the migration planner 116 in Fig. 5), the migration plan 120 “is used by the control 28 to automatically optimize data storage configurations and change data storage configurations during data system operation.” *Id.*, 10:6-9.

In summary, contrary to the assertion made by the Examiner, there is absolutely no disclosure in Borowsky of *feeding back information relating to the execution of the at least one move (of a data chunk in the plan) to the planner, and modifying the plan by the planner in response to the feedback information*. The Examiner also made the following incorrect assertion: “These lines [142, 144, 132] and figure 5 teaches [sic] a feedback mechanism which send [sic] a feedback that goal configurations are not being met and to that [sic] to select another move.” 4/27/2007 Office Action at 4-5. Making a determination whether a goal configuration is met has nothing to do with feeding back information relating to the *execution of at least one move of a data chunk in the plan*.

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In view of the foregoing, it is clear that claim 1, and its dependent claims, are not anticipated by Borowsky.

Independent claim 10, and its dependent claims, are allowable for similar reasons as claim 1.

Reversal of the final rejection of the above claims is respectfully requested.

2. Claims 14, 32, and 33.

Independent claim 14 was also rejected as being anticipated by Borowsky. Appellant respectfully submits that the rejection is in error.

The Examiner had previously conceded that Borowsky fails to disclose “modifying the plan based on feedback configuration information regarding in-progress execution of the at least one move,” as recited in claim 14. 7/31/2006 Office Action at 12. Now, the Examiner has changed the Examiner’s position, with the Examiner now arguing that Fig. 5 and associated text of Borowsky discloses the modifying task of claim 14.

As discussed above, the Fig. 5 process of Borowsky refers to building a migration plan, where the process of Fig. 5 exits as the migration plan 120. Borowsky, 5:35-37. This migration plan 120 is for implementation by the control 28. *Id.*, 5:11. In other words, when building the plan according to Fig. 5 of Borowsky, there is no “feedback configuration information regarding *in-progress execution* of the at least one move” of a data chunk in the plan, since the plan has not yet been executed. Therefore, Borowsky clearly does not anticipate claim 14 and its dependent claims.

In view of the foregoing, reversal of the final rejection of the above claims is respectfully requested.

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3. Claims 15, 17-22, and 24-27.

Independent claim 15 was also rejected as being anticipated by Borowsky. Appellant respectfully submits that the rejection of claim 15 is in error.

Claim 15 recites a planner that is configured to generate a migration plan based upon configuration information, and an executor configured to execute a move in the plan, where the *configuration information* that the planner uses to generate the migration plan relates to *execution of the move*. Borowsky clearly does not disclose a planner that is able to generate a configuration plan based upon *configuration information* that relates to *execution of a move*.

As with the rejection of the other independent claims, the Examiner cited steps in Fig. 5 of Borowsky as disclosing the claimed subject matter. However, it is noted that Fig. 5 relates to *building* a migration plan, such that none of the steps in Fig. 5 would disclose at least one executor configured to *execute a move* in the plan, wherein the configuration information is used by the planner to generate a migration plan.

In view of the foregoing, claim 15 and its dependent claims are not anticipated by Borowsky.

Reversal of the final rejection of claims is respectfully requested.

4. Claim 11.

Claim 11 depends from claim 10, and is allowable for at least the same reasons as claim 10. Moreover, claim 11 recites determining if an executor is available, where executing the valid move is performed by the available executor. With respect to claim 11, the Examiner cited column 5, lines 59-64, of Borowsky as disclosing the recited element. 4/27/2007 Office Action at 12. The cited passage of Borowsky refers to a program processing possible moves, and comparing a current configuration with a goal configuration to determine if the goal

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configuration has been met. However, the cited passage of Borowsky does not disclose *determining if an executor is available*. Therefore, this is a further reason that a *prima facie* case of obviousness has not been established with respect claim 11.

Reversal of the final rejection of the above claim is respectfully requested.

5. Claim 29.

Claim 29 depends from claim 1, and is thus allowable for at least the same reasons as claim 1. Moreover, claim 29 recites that the method of claim 1 further includes executing at least a second move of a data chunk in the *modified* plan, and feeding back information relating to the execution of the at least second move to the planner. Borowsky does not disclose feeding back information relating to the *execution of a second move* of a data chunk in the modified plan to the planner, or modifying the plan by the planner in response to information relating to execution of the second move of a data chunk in the modified plan.

The Examiner again referred to decision block 172 in Fig. 5 of Borowsky as disclosing the feeding back of information relating to the execution of a second move of a data chunk in the modified plan to the planner. Step 172 in Fig. 5 of Borowsky relates to building a migration plan, not to execution of the steps of the migration plan. Therefore, claim 29 is further allowable over Borowsky.

Reversal of the final rejection of the above claim is respectfully requested.

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6. Claim 34.

Claim 34 depends from claim 15, and is thus allowable for at least the same reasons as claim 15. Moreover, claim 34 recites that the adapter is configured to further track configuration information relating to execution of the move and execution of other moves, and that the planner is configured to iteratively modify the migration plan as the tracked configuration information is repetitively fed back to the planner. Borowsky clearly does not disclose a planner to iteratively modify a migration plan as tracked configuration information (that relates to *execution of moves*) is repetitively fed back to the planner.

Reversal of the final rejection of the above claim is respectfully requested.

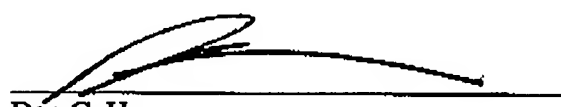
CONCLUSION

In view of the foregoing, reversal of all final rejections and allowance of all pending claims is respectfully requested.

Respectfully submitted,

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VIII. APPENDIX OF APPEALED CLAIMS

The claims on appeal are:

- 1 1. A method for performing adaptive migration and execution, the method comprising:
2 obtaining a plan generated by a planner executable in a computer;
3 adapting the plan to satisfy migration constraints;
4 executing at least one move of a data chunk in the plan;
5 feeding back information relating to the execution of the at least one move to the planner;
6 and
7 modifying the plan by the planner in response to the information.
- 1 2. The method of claim 1, wherein the steps in the method are repeated until no moves are
2 pending.
- 1 3. The method of claim 2, further comprising:
2 waiting for all in-progress executions of moves to complete after no moves are pending.
- 1 4. The method of claim 1, further comprising:
2 waiting for a move to complete if the adaptation of the plan indicates no moves meet the
3 migration constraints.
- 1 5. The method of claim 1, further comprising:
2 estimating load value information; and
3 using the load value information to assist in modifying the plan.
- 1 6. The method of claim 1, wherein adapting the plan comprises:
2 selecting at least one step from the following: pruning at least one move that violates a
3 migration constraint; selecting a largest set of moves that do not violate a migration constraint;
4 and skipping a move that violates a migration constraint.

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- 1 7. The method of claim 1, further comprising:
2 treating a data chunk as existing in an old location and new location while a move is in
3 progress.
- 1 8. The method of claim 1, further comprising:
2 pruning moves that violate an access rule when a move is in progress, wherein the pruned
3 moves are not selected for inclusion in the plan.
- 1 9. The method of claim 7, wherein the step of treating the data chunk comprises:
2 considering the data chunk as decreasing a per-node free space information at both the
3 old location and the new location when a move is in progress.
- 1 10. A method for performing adaptive migration and execution, the method comprising:
2 obtaining a plan created by a planner executable in a computer;
3 determining all valid moves in the plan;
4 executing a valid move;
5 feeding back information relating to execution of the valid move to the planner; and
6 if at least one additional move is required, modifying the plan by the planner based on the
7 information.
- 1 11. The method of claim 10, further comprising:
2 determining if an executor is available, wherein executing the valid move is performed by
3 the available executor.
- 1 12. The method of claim 10, wherein the steps in the method are repeated until no moves are
2 pending.
- 1 13. The method of claim 12, further comprising:
2 waiting for all in-progress execution of moves to complete after no moves are pending.

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- 1 14. An article of manufacture, comprising:
2 a machine-readable medium having stored thereon instructions to:
3 obtain a plan;
4 adapt the plan to satisfy migration constraints;
5 execute at least one move of a data chunk in the plan;
6 modifying the plan based on feedback configuration information regarding in-progress
7 execution of the at least one move; and
8 execute another move in the modified plan.
- 1 15. An apparatus for adaptive migration, the apparatus comprising:
2 a planner configured to generate a migration plan based upon configuration information;
3 an adapter configured to receive the plan from the planner, to receive migration
4 constraints information, target configuration information and current configuration information,
5 and to transmit the configuration information to the planner; and
6 at least one executor configured to execute a move in the plan, wherein the configuration
7 information relates to execution of the move.
- 1 17. The apparatus of 15, wherein the configuration information further includes load
2 information.
- 1 18. The apparatus of 15, further comprising:
2 a load estimator configured to estimate load information for use in determination of the
3 plan.
- 1 19. The apparatus of 18, wherein the configuration information includes the estimated load
2 information.
- 1 20. The apparatus of claim 15, wherein the adapter iteratively obtains plans from the planner
2 until no moves are pending.

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1 21. The apparatus of claim 20, wherein the adapter waits for all in-progress executions of
2 moves to complete after no moves are pending.

1 22. The apparatus of claim 15, wherein the adapter waits for a move to complete if the
2 adapter determines that no moves meet the migration constraints.

1 24. The apparatus of claim 15, wherein the adapter is configured to select at least one step
2 from the following: prune at least one move that violate a migration constraint; select a largest
3 set of moves that do not violate a migration constraint; and skip a move that violates a migration
4 constraint.

1 25. The apparatus of claim 15, wherein the adapter is configured to treat a data chunk as
2 existing in an old location and new location while a move is in progress.

1 26. The apparatus of claim 25, wherein the data chunk is treated by pruning moves that
2 violate an access rule when a move is in progress.

1 27. The apparatus of claim 25, wherein the data chunk is treated by considering the data
2 chunk as decreasing a per-node free space information at both the old location and the new
3 location when a move is in progress.

1 29. The method of claim 1, further comprising:
2 executing at least a second move of a data chunk in the modified plan;
3 feeding back information relating to the execution of the at least second move to the
4 planner; and
5 further modifying the plan by the planner in response to the information relating to the
6 execution of the at least second move.

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1 30. The method of claim 1, wherein execution of the at least one move is performed by an
2 executor, the method further comprising:

3 waiting for the executor to complete the at least one move; and

4 determining whether another move is to be executed;

5 wherein modifying the plan is performed in response to determining that the another
6 move is to be executed.

1 31. The method of claim 1, further comprising:

2 tracking the information relating to the execution of the at least one move by an adapter
3 that also adapts the plan to satisfy migration constraints,

4 wherein feeding back the information is performed by the adapter to the planner.

1 32. The article of claim 14, wherein the machine-readable medium further contains
2 instructions to:

3 wait for an executor to complete execution of the at least one move; and

4 determine whether another move is to be executed;

5 wherein modifying the plan is in response to determining that another move is to be
6 executed.

1 33. The article of claim 14, wherein the machine-readable medium further contains
2 instructions to:

3 estimate load information associated with the plan;

4 wherein modifying the plan is further based on the estimated load information.

1 34. The apparatus of claim 15, wherein the adapter is configured to further track the
2 configuration information relating to the execution of the move and execution of other moves,
3 and wherein the planner is configured to iteratively modify the migration plan as the tracked
4 configuration information is repetitively fed back to the planner.

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IX. EVIDENCE APPENDIX

None.

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X. RELATED PROCEEDINGS APPENDIX

None.